

# Carrier Wave

## September 2004

Newsletter of the Phantom Flyers R/C Club

<http://phantomflyersrc.com>

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Flight line photo by  
Dan Sundman

## Notes From The President: *(Herb Johnson)*

All members,

First subject:

There will be an all club work event Saturday, September 25th. For those who can't make it then we will have a second follow-up on Oct 9th, or contact me or Phil Moore for an individual task if you can't make either date but still want to do something. For those of you who have some health limitations, there are supplies that will need to be procured and delivered to the field. Paint, sealer, steel posts....

Tasks:

Seal runway cracks - Bill Ahrens Lead

Seal west pit, spot seal runway - Tim Wortkoetter Lead

Paint storage container white - Herb Johnson Lead

Dig out areas of ditch and place more steel posts for drive through barriers.

Bring shovels and a few wheel barrows.

Container organization, shelving and ramp for mowers- Mitch Galatioto Lead

Fertilize field.

Cut saplings (further down west ditch near sand piles)

Note: Frank Thomas has a paint sprayer we can use if someone has a generator capable of 3 KW and 220 volts. Any of you got something like that?

Second subject:

The Boeing Family Day is Oct 2nd, and the R/C club display will have to be manned about six hours. We are still looking at a combined display with the Miniature UAV Program with the Maule chase plane as the backdrop. I will be on duty there for a while as a Maule pilot and R/C club member, and we will need another five or so volunteers to monitor the R/C display and planes. This will keep the tour of duty down to an hour per person, so everyone will get plenty of time to enjoy the activities. Please contact me if you can be one of the monitors. We'll talk about this at the next club meeting and also decide which model planes should be on display at the event.

Thanks,  
Herb

# Meeting Minutes, July 28, 2004 *(Ed White)*

Meeting Minutes for Meeting July 28 2004

The meeting was called to order at 7:00 pm.

Treasury report was accepted as presented.

Secretary's report – no report minutes accepted as printed

Recreation report – Boeing open house is October 2 2004 to display inside hanger. A request for 4 tables with electricity has been made. See carrier wave for more details.

Pattern Contest is Aug 28 and 29, please make every attempt to help out so it is not such a burden on a select few.

Spirits having an open house Sept 25

Field managers report – When mowing please empty trash cans. LOAD RED MOWER FIRST THEN GREEN MOWER WHEN FINISHED MOWING. Phil is going to look into on site storage options and bring up findings at next meeting.

Safety Report – No report

Activity report – E-fly had 23 participants that braved the wind to fly. Many were very happy with the event and plan to return next year.

New Business – New roster needs to be generated with wives first names, will look at placing on website with password protection like the carrier waves are.

## 2004 Schedule

EVENT	2004 DATE	DAY	2004 CD
CLUB MTG - ST. PETERS SENIOR CENTER	22-Sep	WED	CLUB PREZ
CLUB MTG - ST. PETERS SENIOR CENTER	25-Oct	MON	CLUB PREZ
CLUB MTG - ST. PETERS SENIOR CENTER	30-Nov	TUES	CLUB PREZ
CHRISTMAS DINNER	4-Dec	FRI	CLUB PREZ

# Propellers: DECIDING ON THE CORRECT CONSTRUCTION, SIZE, AND STYLE

*(Reprinted from the May 2004 AMA National Newsletter)*

By **JOE FINKELSTINE**

The first thing I need to argue is that our propellers could be thought of as similar to the wing on our airplanes. Our wing produces lift by moving through the air, and our propeller creates lift by revolving. If you take a close look at a propeller, you should notice that they have an airfoil shape, just like a wing. At the risk of sounding elementary here, the lift produced by our propeller is more commonly referred to as thrust, and it is what provides the force to move the airplane forward.

Our hobby provides us with an enormous selection of propellers in terms of construction, size, and even style. In particular, over the past few years, I have noticed a much larger selection of propellers specifically engineered for electric flight.

I get the most questions as to what the numbers on a propeller mean. Two numbers classify all of the propellers I am aware of, one being the propeller diameter (length from tip to tip) and the second being the pitch of the propeller. The two numbers usually are listed on the propeller by diameter, then pitch. For example, a 13 x 9 propeller has a diameter of 13 inches and a pitch of nine inches.

The propeller's pitch is a theoretical number in practice. In an ideal world, where the propeller would not slip or have any drag, the pitch represents how far forward a propeller would travel in one revolution. Given our 13 x 9 propeller, the nine means that if I put in some kind of fluid or special air and turned it exactly one rotation, it would move forward nine inches.

Both the diameter and pitch are important as we decide which propeller to use on our model. It often is confusing, particularly to beginners, as to what to choose for a new model. The "right" propeller depends on a number of factors:

- 1) What load the propeller places on the engine
- 2) The model's desired forward speed
- 3) The model's desired acceleration
- 4) Noise considerations of the propeller
- 5) The material the propeller is made of

Every propeller will take effort for an engine to turn, and the amount of effort to turn the propeller is called load. One way to quantify the load is to multiply the two numbers (diameter and pitch) to get a "load factor." This number by itself is meaningless, but it is useful for comparisons of propellers of nearly the same size and diameter. Engine manufacturers often will list more than one propeller for an engine, and if you compute the load factors for the entire family of recommended propellers, the load factors will be clustered together. You can then see if a propeller that is not listed has a load factor in the range defined by the recommended propellers.

The real test for load factor is what rpm the engine will want to turn the propeller at full throttle. If the propeller load factor is too small, the rpm limit of the motor may be exceeded and you'll be back at the hobby shop complaining that the engine made a big clanking sound and then quit running (the clank was your connecting rod breaking in half). On the other hand, if the load factor is too high, the engine will be overloaded, will almost certainly overheat, and will not have much pulling power. The chosen propeller must allow the engine to stay within its recommended rpm range.

Most of my experience is in four-stroke engines and for me, that means whatever propeller I choose, I must ensure my small-to-medium four-stroke engines never tach over 10,000 rpm on the ground. The wide open rpm value also is important in how much sound the propeller makes. Of all the things you think about when trying out different propellers, correct loading is the most important.

The second major issue is the trade off between top end speed and acceleration. Let me start with a generalization. Pitch affects top end speed and diameter affects acceleration. There is a direct trade

off for each propeller and which one is right depends on your style of flying and the type of airplane you're flying.

Let's use my Dave Patrick Ultimate biplane as an example. This biplane is highly aerobatic and I spend a lot of time tumbling it through the air in and out of stall. The ability for me to accelerate from near zero to climbing speed is far more important than how fast the airplane goes at full throttle. For this reason, I chose the largest diameter propeller that the engine (a Saito 180) could handle. The fliers who like very fast models choose the other end of the spectrum and go for as much pitch as possible.

Sport models are a compromise between the two. Many of the aerobatic Almost-Ready-to-Fly (ARF) airplanes are quite specific on the maximum pitch to use because the designer made the model to be highly maneuverable and flying this type of model usually induces flutter. At the moment, I am drooling over a Dave Patrick Edge 540, and he mandates no more than an 8-inch pitch on the propeller. I will use a Moki 1.8 on this ARF, allowing me to fly an 18 x 8 propeller. I may try a 20 x 6, but I'm concerned this will overload the Moki.

If you stay with a propeller that does not overload or underload the motor, the only way I know to select the propeller for acceleration versus top end speed is experimentation. Try out different propellers. For smaller propellers that only cost a few dollars each, this is relatively painless. When you get into propellers with diameters exceeding 18 inches, it gets expensive, so I use the time-honored tradition of borrowing different propellers to test flight characteristics.

The last factor I use in propeller selection is noise. Unbelievably, propeller tip noise often can be the largest contributor to the noise our models make. In particular, when the tip speed of the propeller is at or over mach .75 (yes, that is  $\frac{3}{4}$  the speed of sound), the tip noise generated will be quite large and over our limit almost every time. There is a simple formula for finding the rpm for a given propeller diameter at which the tip speed is mach .75 and it is  $rpm_{max} = 190,000/D$ , where  $rpm_{max}$  = rpm at which the tip speed will be mach .75 and D=diameter. (Please see Table 1.)

Consider a sport two-cycle, .46-size engine. A common propeller for this type of engine might be an 11-7. A sport .46 with a recommended propeller would almost certainly never tach out above 17,273 (see Table 1 on the NNL Web site), but I have seen the Pylon racers, and the original MvV engines tach this high. For most of us who fly sport, we will not bump up against these numbers. I will comment, though, that many engines I use and swing propellers in the 20- to 24-inch range can easily reach the maximum rpm.

The final selection criteria discussed above also is concerned with the material the propeller is made of. At our field, the two most common propellers are either wood or a composite (APC). The wood propeller is a little safer. The two primary disadvantages to wood propellers are their fragility (one nose over and they're finished) and their noisiness.

Composite propellers also have advantages and disadvantages. Primarily, they are more accurate in terms of pitch, pre-balance, and efficiency. I have experimented with this on several occasions and can say that if I take wood and APC propellers of the same diameter and pitch, the APC will turn more rpm on the same engine and appear to be quieter. One of the biggest dangers of APC propellers, however, is they are razor sharp and can cause a lot more damage to your fingers. If your standard landing technique includes

Propeller diameter	Maximum rpm
7	27,143
8	23,750
9	21,111
10	19,000
11	17,273
12	15,833
13	14,615
14	13,571
15	12,667
16	11,875
17	11,176
18	10,556
19	10,000
20	9,500
21	9,048
22	8,636
23	8,261
24	7,917



nosing over, the APC propellers are the way to go. In the end, one of the best methods when you start looking for a propeller is to watch and ask. Look for a similar model at the field and observe how it flies. Ask the owner which propeller he or she is using. If it is an aerobatic model, watch how it accelerates and how it behaves full throttle. I also have found the Radio Control bulletin boards on the Internet to be helpful. Hope you are already making balsa dust for next flying season!

from Skywriter  
Skymasters Radio Control Club  
Mark Smith, editor  
Lake Orion MI

## Hints & Tips

### Bubble Free Monokote Trim

There is a method that I use that works well for attaching strips over monokote with out causing bubbles.

Mix 8 oz water with 1 oz monokote trim solvent and 1 oz liquid dish detergent together. Cut your stripping as desired. Spray the strip and the wing (example) and lay down the strip using a credit card to squeegee out the water. Mop up excess water with towel. Let it set overnight and the next day seal the edges with MEK-- methyl-ethyl-ketone, purchase at hardware store. The edges won't come loose.

This works well on relatively flat surfaces such as wings.

Submitted by Phil Moore



# GSLMA MINUTES *(May 5, 2004, submitted by Bill Ahrens)*

GSLMA MINUTES

September 1, 2004

MEETING OPENED: 7:00 PM

ATTENDANCE: Aero Pilots, Balsa Busters (IMA & AMA), Laf. Esq., Lone Eagles, Signal Chasers, St. Louis R/C, Thermaleers, Whirley Birds

MINUTES: Approved as published

TREASURER'S REPORT: Old Balance \$5912.36      New Balance \$5471.89  
2004 Buder Permits Issued in August - 21

## OLD BUSINESS:

- Buder Flying Surfaces Repairs: The repair work was completed as scheduled on August 10 & 11. There was a very good turnout. Thanks to everyone who participated and special thanks to Chuck Gasner who organized the project and to Lois Conger who fed the work crew.
- Balsa Busters (AMA) was elected to membership in GSLMA. Henceforth, Balsa Busters will be represented by a single GSLMA rep and will have one vote on the issues coming before GSLMA.

## NEW BUSINESS:

- All the plans for the Swap Meet and Flying Demonstration at the Planetarium for the weekend of October 2 have been cancelled. We were unable to get a permit to use the field for the flying demonstration.
- A two-day Swap Meet at Buder Park will be held Saturday and Sunday, October 2 and 3, from 8:00 AM until noon. The Buder R/C field will be closed to flying during the Swap Meet.
- Bruce Weidner, President of the St. Louis Rocketry Association gave a presentation on the Association activities and launch locations. They launch at Buder R/C field on the third Saturday of each month. GSLMA will add Mr. Weidner to its mailing list and the Rocketry Association will add the GSLMA president to its mailing list in order to keep current on activities and plans. The Rocketry Association plans to participate in the Flying Extravaganza being planned for August 2005 at Buder Park.
- Bob Arata (Laf. Esq.) gave a presentation on how to keep the cost of flying trophies down. Laf. Esq. sponsors seven events a year and must present at least twenty-one trophies. Fabrication of one-of-a-kind trophies from recycled parts, and other pieces gathered from toy stores makes for interesting and very desirable objects. Many examples of original design were shown. Thanks Bob, for a great presentation.
- Steve Mizerany asks everyone to please bring ideas for a GSLMA meeting place other than the County Library. Meeting at the Science Center is no longer an option.

MEETING ADJOURNED: 8:15PM

NEXT MEETING: Wednesday, October 6, 2004 at 7:00 PM in the East Room of St. Louis County Library on Lindbergh Blvd.

Boeing Employees RC Model Airplane Club

c/o Brian Kretchmar

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